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ABSTRACT

A developmental model for a junior high school course in future studies is presented, and the relationship of the model to extant curricula, research data, and needs analyses is discussed. A design for integrating this model with a second problem-solving problem model to create a future-oriented, inventive problem-solving program is also presented. The utility of this integration for sequencing instruction and for designing realistic evaluation indices, as well as the implications of these models for designing a future studies curriculum are discussed. Two sample student questionnaires designed for use in a future studies course are included in the appendix. (Author/JG)

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A Model for a Skill-Oriented Future Studies Curriculum

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A paper presented at the Annual Meeting of the
American Research Association, New York, N. Y., April, 1977

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A Model for a Skill-oriented Future Studies Curriculum

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Introduction

Future studies has recently become a topic of interest among educators concerned with improving the preparatory function of schools. Despite the shortness of its history, the absence of a research base, and a questionable reputation as a discipline, the needs and goals expressed by adherents of future studies show a surprising commonality. The way to satisfy these needs and achieve these goals, on the other hand, is less than straightforward. This paper will present a model which was generated in order to guide the development and evaluation of a program whose objectives deal, in part, with future studies. Although one aim of the model was to correct for shortcomings in the goal specifications found in other conceptions of futures studies, it should be evident that the lack of both basic and applied research make model building in this area as hazardous as forecasting.

The need for Future Studies

According to Kauffman (1976b), the number of university level courses had risen from one in 1966 to over 400 by 1973 and the number of pre-college courses from one in 1967 to almost 600 in 1976. The accelerating interest in future studies, referred to by various writers as futuristics, futurism, futurology, forecasting, and futures research, is, in large measure, attributable to the writing of Alvin Toffler, especially Future Shock, (1970). Toffler's principle

argument for taking futures studies into the classroom, centers on the rapidity of social and technological change. Preparing students to adapt to and cope with these changes, according to Toffler, requires that students learn not only information about the future, but the habit of anticipating change as well. Kauffman (1976a, 1976b) stresses the salience of present and anticipated world problems and the necessity to understand long-range issues and appreciate foresight. Livingston (1973) presents two additional reasons: the necessity to acquaint students with the activities of futurists, and, the need for students to begin thinking in terms of alternative futures.

From a student-centered perspective, future studies in seen by a number of authors as providing a remedy for the discontinuities that exist between the demands of the school world and those of adult roles in the real world. Torrance (1976b) sees the problem in the same way as do supporters of career education — that students fail to see the relationship between what they learn in school and what they will do when school is over. In a related fashion, Rojas and Eldridge (1974) found that a number of futures studies courses were used as a method for improving students' career choices; Shane and Shane (1974) stress the need to teach planning; Peakes, Burnia, Cherniak and Dede (1973) emphasize the importance of teaching students to set short- and long-term goals.

As noted earlier, useful research in the area of futures studies and instruction is almost nonexistent. Singer (1974) points to some clinical studies that suggest a relationship between academic achievement and future orientation as measured by projective tests. For Singer, a persons' "Future-Focused Role Concept," or the extent to which a person has an image of himself or herself in a future role, correlates positively with achievement in school, the avoidance of

delinquency, and a feeling of optimism about the future. Toffler (1974) reports an informal study in which a group of high school students were asked to compose a list of future events as well as a list of events that might happen to them personally. The disconnectedness between these lists, that is, students' tendency to believe in dramatic world changes while projecting a conventional future for themselves, is viewed by Toffler as evidence that the majority of students have failed to personalize their expectations about social change. Toffler also cites studies conducted at Cornell and UCLA where groups of students were asked to either finish a story by telling what the characters did or finish it by describing what they will do. While the past-tense groups tended to write richly-detailed accounts, the story endings written by the future-tense groups were sketchy and brief. Toffler implicates the past-centered curriculum for students' inability to be imaginative in the future tense.

Goals of a Future-oriented Curriculum

It is difficult to consider the question of what are appropriate goals for a course in future studies apart from the question of method. Writers and developers share the same or similar broad goals yet stress a different blend of instructional strategies. Rojas and Eldridge (1974) have compiled a list of alternative goals from a survey of "futurist" courses offered in North America. Despite the fact that this survey is dated and covered primarily university-level courses, the following goal statements are, for the most part, sufficient to describe more recent futures studies courses, even those at the elementary and secondary level:

1. help students anticipate change, i.e., make better career choices, future-oriented attitudes, etc. (e.g., Torrance, 1975, 1976b, 1976c)

2. survey forecasting methods (e.g., Dede, 1971, 1974; Glenn, 1975; Peakes, Burnin, Cherniak and Dede, 1973)
3. develop the ability to relate ideas and information between disciplines (e.g., Shane, 1974)
4. facilitate student-to-student and student-to-teacher interaction (e.g., Pierce, 1972)
5. recognize the continuing impact of technology upon society (e.g., Kauffman, 1976b; Livingston, 1973; Olno, 1976)
6. develop the ability to evaluate forecasts and utilize feedback to do so
7. study major trends shaping the future (e.g., Kauffman, 1976b)
8. explore ideas, images, models of the future (e.g., Livingston, 1971; Driessel, 1971)
9. examine case study forecasts in specific problem areas (e.g., Livingston, 1973; Kauffman, 1976b; Cohan and Gustafson, 1975)
10. develop alternative scenarios of the future (e.g., Torrance, 1976c; Strudler, 1974).

Instruction in future studies at the secondary level

The review above is an abbreviation of an analysis focused on what writers believe to be the principle needs, goals, and emphases to be addresses with a future-oriented curriculum. In order to try to identify specific objectives and instructional strategies that might serve the attainment of these goals, a further analysis was required.

The following classification scheme represents a rough sort of the course descriptions, course outlines, and articles and books on teaching strategies that

are currently available.[1]

Topical approaches. Most future studies courses are organized according to topics. The topics seem to be chosen for their fertility for suggesting issues and problems associated with technological and social trends and changes. Popular topics include ecology, population, land use, the elderly, food, automation, and genetics, (Olno, 1976; Cohan and Gustafson, 1975; Buchanan, 1970).

Science fiction. Kauffman (1976b) endorses the use of science fiction for stimulating the imagination and for introducing plausible alternative futures. Both Livingston (1971) and Driessel (1971) view science fiction to be central to a program in future studies.

Teaching techniques of forecasting. Shane (1973) lists the techniques and devices used to construct forecasts as: (1) human reasoning, (2) the computer, (3) the Delphi methodology, (4) trend extrapolation, (5) simulation models (6) scenarios, (7) multiple correlation and factor analysis, (8) cross-impact matrices, (9) trend-impact matrices, and (10) experience compression techniques, e.g., simulations. Most future studies courses use some of those techniques in some fashion, especially scenarios and trend extrapolation. Some developers view these techniques as central for identifying future trends, identifying consequences of trends, and exploring alternatives (Glenn, 1975; Glen and Guy, 1974; Dede, 1971, 1974). Glenn reports success with students as young as grade five using the cross-impact matrix and the future wheel technique.

"Personalizing" the future. Among those writers and developers who

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[1] Besides the works cited in this section, six samples of unpublished high-school level programs were considered in the construction of this classification.

emphasize the future-focused role image of students, the necessity to integrate students' personal and social projections of the future is viewed as the primary focus of future-oriented instruction (McDanield, 1974; Hollister, 1974; Torrance, 1975). McDanield emphasizes value clarification while Torrance employs sociodrama as a means to this end.

Problem solving and divergent thinking techniques. The necessity to encourage the use of the imagination is a recurrent theme throughout the literature on future studies. Bell (1974) recommends that students be led "to transcend past experience, to creatively invent the future..." (p.76); Strudler (1974) describes the best of the future studies courses as one that would "blend the 'science' of charting the probable with the art of imagining the possible..." (p.175). McDanield and Mendall (1975) review two creative problem-solving models and recommend that all futurists combine methods of vertical (logical) thinking with techniques useful for fostering lateral (creative) thinking.

Toffler (1974) envisages an "action learning" futures studies course that involves students in solving future problems through the generation of alternatives, the development of plans, and a consideration of contingencies and consequences. Buchanan (1970) combines problem solving and decision making in a course focused on the year 2000. Torrance (1976b, 1976c) describes a future problem solving and career education course that incorporates the Osborn-Parnes creative problem-solving model (Osborn, 1963; Parnes, 1967).

Multi-faceted approaches. Two handbooks on teaching future studies deserve special mention in that they both incorporate a wide range of approaches. Both LaConte (1975) and Kauffman (1976b) combine science fiction, simulations, and instruction in the use of forecasting techniques. In addition, Kauffman

recommends that a course in future studies make a deliberate attempt to alter students' beliefs about the future by teaching them some of the concepts, principles, and assumptions that guide the work of professional forecasters and planners.

A Model for a skill-oriented future studies curriculum

The model presented below began with the idea to develop a future-oriented creative problem solving course, (Thomas, 1975). Initially, the goal was to develop a teacher-led course of instruction for junior-high school students which would focus on skills and strategies for defining and solving open-ended problems using future-oriented topics as its content. In the process of development, the course (the *Making Changes* program) has been expanded to provide instruction in those aspects of future studies that serve the overall goal of problem-solving competence. The following general goals guided the development of the model and the course.

A. Problem solving

1. to teach a general problem solving strategy useful for defining and seeking solutions for a variety of types of open-ended problems.
2. to teach a limited number of variations on this model to accomodate
   a. group vs. individual tasks
   b. problems where additional facts, forecasts or criteria must be identified
   c. problems that necessitate the application of a principle
3. to teach strategies and techniques presumed to be useful for carrying out the requirements of each of the stages
4. to introduce rules and role requirements in order to facilitate group participation, cooperativeness and productivity
5. to foster positive student attitudes towards problem solving, group work, and divergent thinking.

B. Future studies

1. to teach ways of thinking about the future consistent with the assumptions held and concepts employed by futurists

2. to teach a limited number of skills and provide sufficient information in order that students become able to interpret and compare different types of forecasts, evaluate forecasts, and identify potential problems implied by forecasts.

3. to teach students how to use a limited number of forecasting techniques and further, to encourage their selection and use in solving problems (these techniques to be selected for their fertility for problem identification, idea generation and the evaluation of solution ideas).

4. to provide opportunities for students to use their imagination in discussions and exercises on future issues.

5. to provide opportunities for students to construct and compare forecasts concerning social and personal futures.

C. General goals

1. to increase students' fluency, flexibility and originality with respect to a variety of open-ended questions and problems, including the description of alternative futures.

2. to teach for and encourage the autonomous use of all the skills, strategies and techniques used in the course in both group and individual settings.

3. to provide for the maintenance of positive attitudes toward the course by both students and teachers.

Insert Figure 1 & 2

Assessment

One of the principal difficulties with the model concerns the specification and assessment of treatment effects associated with instruction in future studies. Whereas considerable research exists relative to training creative skills and creative problem solving, (Torrance, 1976a, reviews 142 studies), no training studies in future studies were found. Whether you are interested in teaching skills related to forecasting or wish to affect students attitudes or beliefs

about the future, the literature provides little guidance concerning what kinds of effects would be most valuable and what kinds of interventions might be most powerful. The "shotgun approach" evident in the model reflects this situation.

Torrance (1976c) reports a study conducted with gifted high-school students enrolled in a "Summer Institute for Career Development." Two-hundred of these students studied: (1) scientific and technical implications for 21st century man, (2) Western man's social and political culture, and, (3) career education. These students were asked to write a career narrative plan and either a scenario about a day or week in their life in the year 2001, or a soliloquy — a statement of accomplishments written as if the student was writing in the year 2000. The narrative plan, scenario, and soliloquy were administered as pretests and posttests to the 200 experimental students as well as 138 controls. Results were scored according to the following dimensions:

1. expressed satisfaction with future career
2. perception of world/mankind as changed
3. heightened consciousness of trying to do something to make the world better/solve future problems
4. originality, imagination, and involvement
5. solutions to future problems proposed
6. perception of self as a creative problem-solving person.

In order to assess the effectiveness of the summer program on students' "future orientation," Torrance compared pretest to posttest scores for the experimental group on all of the above dimensions and, in addition, counted the number of topics ("areas of concern") mentioned by students in their scenarios.

Torrance found that posttest means for the scenario were significantly higher than pretest means in all six dimensions listed above. He also found that all nineteen areas of concern identified prior to the study were mentioned more often in the posttest scenarios than in the pretest scenarios. Torrance also found that the instructed students scored significantly higher than the uninstructed controls on all six of the above dimensions on the posttest scenarios.

In light of Torrance's finding that instructions to write a scenario provide a good measure of an individuals beliefs about the future as well as a measure of his or her "future-focused role image," a scenario assignment was incorporated as a pre- and posttest measure for the Making Changes program (Futures Questionnaire, Appendix A). In addition to selected dimensions from Torrance's design, the following dimensions will be considered for each student:

1. Fluency — total number of words
2. Flexibility — total number of topics or areas of concern mentioned
3. Originality — the nature of the changes described for each topic mentioned:
    a. conventioned forecast — student describes the future as if were the present; no sense of the future as changed or changing
    b. quantitative change — student describes or implies a "more than" or "less than" projection based on a present-day trend
    c. qualitative change — student describes a new development, trend, or invention.

In addition to the scenario, Futures Questionnaire A asks for descriptions of the future of: (1) work, (2) housing, (3) crime and poverty, and (4) education. Selected dimensions from Torrance's study as well as the dimensions of fluency, flexibility and originality will be used to look for possible pre-post differences in students' descriptions of these four areas.

Kauffman (1976b) regards changes in students' beliefs and attitudes about the future as among the most important effects of a future studies course. Using little more than the opinions of various authors as a base, a taxonomy of beliefs and attitudes that might compose a person's orientation to the future was constructed (Appendix B). From this taxonomy and from a questionnaire included in Kauffman's handbook (pp. 72-73), a second questionnaire was constructed (Futures Orientation Survey, Appendix C). Among the dimensions presumably represented in this questionnaire are: (1) optimism, (2) belief in self-determination, (3) predictability of the future (4) belief in the certainty of change, (5) confidence in problem solving in relation to studying the future, and (6) belief in the worth of studying the future.

It is hoped that analyses of these two futures questionnaires, supplemented by classroom observation, student interviews, and protocols from the problem-solving tasks included in the program will lead to a further refinement of assessment procedures and measures in the area of future studies. Preliminary testing revealed that junior-high school students know more about possibilities for the future than was anticipated. On the other hand, these same students appear to be less imaginative about alternative futures than anticipated. If this finding turns out to be reliable, it may provide additional justification for combining inventiveness and problem solving with the study of alternative futures.

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Figure 1

A Model for a Future-Oriented Program
in Inventive Problem Solving

Categories of Instructional Objectives	Type of Instructional Technique Employed	Features of Instructional Techniques	Assessment Procedures
Competence at using process models to solve problems	Osborn-Parnes Creative Problem-Solving Model with minor variations (Osborne, 1963; Parnes, 1967)	stating the problem, fact finding, exploding the parts, generating criteria, weighting criteria, implementing ideas	Cognitive objective-referenced mastery test; objective-referenced proficiency test; criterion task; observation Affective Childhood Attitude Inventory for Problem Solving
	the Synectics model with minor variations	stating the problem, fact finding, exploding the parts, purging ideas, wish statements, selection of analogy methods, force-fitting ideas.	
Fluency, flexibility, orginality of ideas	techniques for defining problems (Parnes, 1967)	using "how," verb change, reversal, and broad terms	Cognitive Torrance Tests of Creative Thinking, Verbal, Forms B & C (Torrance, 1966) Sheridan Creativity Tests Alternate Uses Form B Seeing Problems Form A Apparatus Test Objective Synthesis Consequences Form A-1 objective-referenced mastery test; objective-referenced proficiency test; criterion task; contest (Parnes & Noller, 1974)
	techniques of free association (Parnes, 1967)	brainstorming, variations on brainstorming, hitchhiking	
	product improvement techniques (Davis, Manske & Train, 1967)	checklist	
	force fit techniques (Davis, Manske & Train, 1967)	checkerboard	
	Using analogies (Gordon, 1973)	direct analogies, symbolic analogies, personal analogies (three types)	
	narrative techniques (Torrance, 1976 b, c)	scenario, soliloquy	
Productive group work	roles	leader, recorder, reporter, liaison person	objective-referenced mastery test; criterion task; observation
	rules (Glatthorn, 1971)	no criticism; the use of group rating forms	

Figure 2

Categories of Instructional Objectives	Type of Technique Employed	Features	Assessment Procedures
Concepts of Future Studies	guided reading assignments; background information for problems	reasons for studying the future; major trends, developments, issues; a case study — the future of work	Cognitive curriculum-imbedded tests, Futures Questionnaire A Affective Futures Questionnaire B
Skills for interpreting trends and evaluating	exercises, homework assignments	criteria for evaluating forecasts; interpreting graphs, plotting linear and accelerating trends, generating implications	Cognitive objective-referenced mastery test, objective-referenced proficiency test Affective Criterion task
Constructing forecasts	the Delphi (Kauffman, 1976 b)	surveying the community, constructing timelines	Cognitive objective-referenced mastery test, objective-referenced proficiency test, criterion task Affective Futures Questionnaire A
	cross-impact matrix (Glenn, 1975)	identifying interactions, consequences, rating desirability, assessing consequences to self	
	scenario (Torrance, 1976 b, c)	incorporating trends, identifying consequences, generating alternatives	
	future wheel (Glenn, 1975)	identification of needs and consequences	
Overall problem-solving competency	simulation (Vista I)	problem task — limited guidance (five concrete problems)	Cognitive criterion task Affective Childhood Attitude, Inventory for Problem Solving; observation
	simulation (Vista II)	problem task — limited guidance (five abstract problems)	

APPENDIX A

FUTURES QUESTIONNAIRE

Code____ _____

What might the world be like 20 years from now? What might be happening? What might be new and different? What might you be doing?

1. My future. Use the space below and the back of this sheet to describe what you might be doing in 20 years' time. Try to imagine a specific day or week in your life 20 years from today. Describe what you might be doing to earn your living. Describe where you might be, who you might be with, what might be happening in the world, and how you feel about all of these things.

FUTURES QUESTIONNAIRE Code_____

Read all the questions below. Answer the ones that interest you the most. Answer as many as you can. Use the back of this sheet for additional space.

2. The world of Work. Some of the ways that I think the world of work might be different in 20 years are...

3. Housing, USA. In 20 years, some of the changes in housing might be...

4. Crime and Poverty. Crime and poverty (the condition of being poor) are important problems throughout the world today. How might things be different in 20 years?

5. Education. Today's classrooms look almost the same as they did in 1900. In 20 years, some possible changes could be...

APPENDIX B

PROPOSED DIMENSIONS

OF

"FUTURE ORIENTATION

A. Knowledge of, committment to:

1. the salience of forecasted world problems (population growth, shortage of resources, shortage of food and land, pollution, etc.)

2. the interdependence of today's world economy, the interrelatedness of world problems, the necessity for a global consciousness in planning and problem solving.

3. the explosive rate of change (eg. the knowledge explosion)

4. the dangers of shortsightedness

5. the implications of exponential growth

6. the various proposals, anticipated changes and forecasted developments currently being discussed in such areas as (family planning, health and medicine, transportation, food, housing, power and energy, food, behavioral sciences, communication, business and work, environment, leisure).

B. Beliefs concerning:

1. the possibility vs probability of multiple futures vs. a single future

2. our moral obligation to the future and its social order

3. the role of technology in the future

4. the role of values in/on the future

5. the malleability of the future (determinism)

6. the uncertainty of certainty

7. the worth of alternative futures

8. an individual's ability to influence the future

9. the students ability to influence his/her future.

C. Attitudes concerning:

1. the desirability of "the future" (alternative futures)

2. the desirability of the students' own future

3. the value of studying the future, learning about alternative futures, planning, anticipating problems

4. the quality of life in the future

5. the importance of imagination, generating alternatives for alternative futures

6. the importance of choice, free will, participation in decision making.

D. Skills relating to:

1. evaluating information about alternative futures

2. the interpretation of forecasts

3. conducting, generating forecasts

4. using forecasts in planning and solving problems (societal goals/problems)

5. using forecasts in planning ans solving problems (personal and career goals/problems)

6. generating consequences for anticipated developments

7. evaluating the impact of two or more trends

8. finding information concerning alternative futures

9. generating ideas for alternative futures (fluency, flexibility, originality).

E. Dispositions to:

1. take action with respect to all of the above to:

   a. select additional reading

   b. identify/anticipate problems/issues

c. conduct problem-solving ventures

d. generate plans

e. take part in discussions

2. resolve discrepancies between personal forecasts (goals) and societal forecasts

3. see self as changed/changing/changeable and bound to change in the future.

APPENDIX C

FUTURES ORIENTATION

SURVEY

Directions: The purpose of this survey is to find out what you think about the future. Read each statement in the survey and then mark your answers according to the following instructions:

If you Strongly Agree with the statement, then circle the letters (SA).

If you Agree with the statement, then circle the letter (A)

If you are Not Sure whether you agree or disagree with the statement, then circle the letters (NS)

If you Disagree with the statement, then circle the letter (D).

If you Strongly Disagree with the statement, then circle the letters (SD).

This is not a test. There are no right or wrong answers. Be sure to answer all the questions.

Code_____

	STRONGLY AGREE	AGREE	NOT SURE	DISAGREE	STRONGLY DISAGREE
1. Generally speaking, the human race is moving toward a more desirable future.	SA	A	NS	D	SD
2. Each person's future is largely a matter of luck (good breaks and bad breaks).	SA	A	NS	D	SD
3. It is possible to predict (be able to tell what will happen in) the future.	SA	A	NS	D	SD
4. The future 25 years from now is likely to be completely different from the present.	SA	A	NS	D	SD
5. American "know-how" can solve any problem that might occur in the future.	SA	A	NS	D	SD
6. Generally speaking, a person is able to control his/her future.	SA	A	NS	D	SD
7. Studying the future will help us to solve problems in the present.	SA	A	NS	D	SD
8. The future is a complete mystery -- we have no idea what to expect.	SA	A	NS	D	SD
9. Not much is likely to change in the next 25 years.	SA	A	NS	D	SD
10. The future of the human race is largely beyond our control.	SA	A	NS	D	SD
11. It is possible that the future will bring problems that people will not be able to solve.	SA	A	NS	D	SD
12. The future will probably be less desirable than the present.	SA	A	NS	D	SD

	STRONGLY AGREE	AGREE	NOT SURE	DISAGREE	STRONGLY DISAGREE
13. Future problems will be even more difficult to solve than present-day problems.	SA	A	NS	D	SD
14. There won't be as much change in the next 25 years as there was in the last 25 years.	SA	A	NS	D	SD
15. At any given time, there is a wide range of possible futures open to us.	SA	A	NS	D	SD
16. Solving future problems depends, in part, on imagination (thinking of many different ideas).	SA	A	NS	D	SD
17. Studying (predicting) possible futures is a waste of time and money.	SA	A	NS	D	SD
18. We can expect even more change in the next 25 years than we've seen in the last 25 years.	SA	A	NS	D	SD
19. No matter what people do, the future will probably be less desirable than the present.	SA	A	NS	D	SD
20. A good way to solve future problems is to wait until they occur.	SA	A	NS	D	SD